



UNITED STATES ENVIRONMENTAL  
PROTECTION AGENCY  
REGION IX  
75 Hawthorne Street  
San Francisco, CA 94105



STATE OF HAWAII  
DEPARTMENT OF HEALTH  
P. O. BOX 3378  
HONOLULU, HI 96801-3378

Captain Marc Delao  
Regional Engineer  
Navy Region Hawaii  
850 Ticonderoga St. STE 110  
Joint Base Pearl Harbor Hickam, Hawaii 96860

**Re: ~~Conditional Approval~~ to revise schedule for deliverables 6.3- Investigation and Remediation of Releases Report and 7.1.3.- Groundwater Flow Model Report of the Red Hill Administrative Order on Consent ("AOC") Statement of Work ("SOW")**

**Commented [MN1]:** I am unclear as to why we say conditional approval. What are we conditioning the approval upon?

Dear Captain Delao:

The U.S. Environmental Protection Agency ("EPA") and Hawaii Department of Health ("DOH"), collectively the "Regulatory Agencies", have received the U.S. Department of Navy's ("Navy's") letter dated October 12, 2018, and are approving the Navy's request for a ten-month extension to the Red Hill AOC SOW Sections 6.3 and 7.1.3. ~~The Navy shall use contingent upon. The Regulatory Agencies expect the Navy to utilize this extension to address Regulatory Agency concerns outlined in our XX date letter to Mr. Mark Manfredi related to the conceptual site model ("CSM") and groundwater flow model ("GFM") and meeting intermediary milestones to ensure that substantial progress is made during this 10-month extension. Although this environmental work will help with ongoing and future planning decisions, this extension approval should not adversely impact the current schedule and deadlines for work required pursuant to Red Hill AOC SOW Section 3 Tank Upgrade Alternatives.~~

~~The Regulatory Agencies reviewed the Groundwater Protection and Evaluation Considerations for the Red Hill Bulk Fuel Storage Facility (dated July 27, 2018) and Conceptual Site Model, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility (dated July 27, 2018) developed by the Navy and its contractors. These interim documents detail the Navy's comprehensive understanding of the conceptual site model representing the Red Hill Bulk Fuel Storage Facility ("Facility") and the surrounding environment, as well as a preliminary model of local and regional groundwater flow.~~

**Commented [ILK2]:** This middle portion of the letter will be part of the cover letter to Regulatory SME comments.

**Commented [MN3R2]:** Yes - ok.

The Regulatory Agencies continue to believe that some of the interpretations and determinations made in the interim documents are premature or inappropriate after reviewing the supporting data and conducting independent analyses. During in-person meetings August 14–16, 2018, the Regulatory Agencies’ environmental experts gave a presentation on issues of concern related to the interim information that had been made available at that time. We also acknowledge that the Navy has collected and compiled significant quality data for this effort, and the Navy’s efforts continue to improve in this regard. As summarized below, the Navy should use this extension to address several key aspects of the ongoing environmental investigation and interpretation work.

Additional supporting materials developed by the Regulatory Agencies’ consultants and subject matter experts are provided in the enclosure attached to this letter. The content of the enclosure serves as a basis for the ten issues identified below:

#### **Conceptual Site Model (“CSM”)**

The CSM should explain all observed data in the field to the extent possible and data that are not incorporated into the model, even if qualified, should be thoughtfully considered. Conceptual and numerical models that best fit available data are critical for technical defensibility of the application of the model to evaluate flow paths and contaminant fate. In particular, the Regulatory Agencies continue to have concerns with the following aspects of the CSM:

- 1) Predominant strike and dip of basalt in the geologic model—The direction and magnitude as represented by the Navy thus far do not reflect the information that has been provided to, or independently evaluated by, the Regulatory Agencies. This information is important because it will influence Navy’s conclusions regarding groundwater flow paths and transport.
- 2) Saprolite extent in interim model vs. measured depths—The extent of the modeled and measured depths of the saprolite/basalt interface do not agree. In particular, the slope of this interface appears misrepresented in the model, which impacts the flow paths predicted by the interim model.
- 3) Preferential pathways—The consideration and methods of incorporation of preferential pathways in both the CSM and the groundwater model are unclear. Although it is impracticable to precisely characterize these features, they should be explained conceptually and incorporated into the GFM using appropriate and traceable mathematical representation.

#### **Fate and Transport**

The *Contaminant Fate and Transport Model Report* required by Red Hill AOC Statement of Work is not due until 180 days after the approval of the *GFM Report* and the *Investigation and Remediation of Releases Report*. Therefore, a *Contaminant Fate and Transport Report* is not anticipated to be completed until the middle of 2020 after our approval of this extension request. However, we expect conservative contaminant fate and transport considerations to be discussed as a component of the Navy’s upcoming tank upgrade proposal at Red Hill.

The Navy’s current CSM and statistical Non-Aqueous Phase Liquid (“NAPL”) holding model do not adequately address potential impacts to groundwater from fuel releases, account for Light Non-Aqueous Phase Liquid (“LNAPL”) migration processes, or explain lines of evidence for

historical transport observed in the field. Although local characterization data indicates that substantial natural attenuation of hydrocarbons may be occurring, field characterization of the subsurface is highly challenging and impractical in some areas near and around the tanks at the Facility. Therefore, conservative assumptions bounding NAPL fate and transport or robust, dynamic fate and transport models are critical for long-term environmental stewardship. The Navy should address the following issues:

1) Light Non-Aqueous Phase Liquid ("LNAPL") fate and transport—The CSM for LNAPL transport needs to more broadly consider potential rates, directions and distances of LNAPL transport and the primary features and processes affecting that potential transport. The Navy should present the Regulatory Agencies with an approach for developing modeling of LNAPL fate and transport in this environmental setting. The final model should consider potential rates and directions of transport as a function of different types of releases, provide source terms to determine if releases can be captured through pumping, model cumulative effects of releases over time, and utilize incoming field results and new information to calibrate model outputs to observed conditions.

2) Groundwater data—Interpretations of groundwater data from before and following the time of the 2014 release do not adequately consider limited data density and the range of plausible interpretations, including the probability of northerly contaminant transport. Additionally, general water quality indicators including nitrate and dissolved oxygen should be closely examined as lines of evidence for transport and attenuation of past releases.

3) LNAPL and dissolved phase distribution—The CSM presumes a specific distribution of LNAPL as an outcome of the 2014 release (and prior historical releases), without sufficient data to support this presumption (i.e., the Regulatory Agencies do not view the thermal profile interpretation as definitive). Vapor monitoring data from the time immediately following the release, as well as other historical data suggests other possible distributions may be possible. Based on the data that are currently available, the Regulatory Agencies believe that a range of possible LNAPL distributions is plausible and the Navy should more closely examine the data and consider the plausible range of migration pathways and timeframes.

#### **Recommended Schedule for Navy's Extension**

The Regulatory Agencies recommend the following schedule during this extension to address the issues detailed in our August 14-16 meetings with the Navy, our XX DATE letter and other concerns highlighted in previous technical meetings above milestones as condition of the extension approval. We anticipate that the The Navy may want choose to should consider providing additional opportunities for focused technical discussion with the AOC parties and/or external Subject Matter Experts remotely or in person, as needed to reach agreement on key technical decisions well in advance of deliverable submission. The Navy should also consider appropriate avenues and times for engaging external Subject Matter Experts.

Recommended Schedule for Navy Extension	
Date	Task
November 2018	Kickoff Meeting with Agencies
November – March 2019	Data Evaluation, CSM Updates and GFM, Fate and Transport Updates
April 2019	Review with Regulatory Agencies and External SMEs Updates to the CSM, Interim GFM, and F&T
May – June 2019	Continue GFM Updates and Predictive Simulations
July 2019	Presentation of Draft Deliverable to Subject Matter Experts
October 2019	Final Section 6.3 and 7.1.3 Deliverable Submittals

**Commented [ILK4]:** Would like opportunity to discuss with team.

**Commented [GGF5]:** This still needs more specifics. For example, action item updates and areas of concurrence should be presented at kickoff and updated at least 3 times before the July draft.

**Commented [MN6R5]:** I am not in favor of being too prescriptive about the meeting agendas at this point. Note that in the paragraph above, we recommend that the Navy meet with agencies and SMEs prior to submitting deliverables.

### Response Requested

The Regulatory Agencies concur with the Navy that the deliverables required per Section 6.3 and 7.1 of the Red Hill AOC SOW shall be submitted to us no later than October 5, 2019, ~~with the aforementioned stipulations.~~ The Regulatory Agencies ~~request require~~ that the Navy respond to this letter via letter or email by November 16, 2018 with a proposed schedule over the course of the extension and to confirm receipt of this ~~conditional extension approval.~~ ~~Agreement by the AOC parties on the schedule of intermediary milestones is a condition of this approval.~~ The Navy's schedule should include dates where it expects to seek agreement with the Regulatory Agencies on key issues prior to submitting the final deliverables.

~~Accounting for NAPL effects on groundwater and drinking water resources is important for the upcoming tank upgrade proposal and we would like to engage the Navy and its consultants in further discussion to resolve outstanding issues regarding NAPL fate and transport.~~ The Regulatory Agencies also encourage the Navy to concurrently continue its efforts to install more groundwater monitoring wells to further improve its modeling efforts. We look forward to your response to this letter and the upcoming environmental work required as part of the AOC. Please let us know if you have any comments or concerns with the information in this letter.

**Commented [ILK7]:** We can address this in the comment letter.

Sincerely,

Omer Shalev  
Project Coordinator  
EPA Region 9 Land Division

Roxanne Kwan  
Interim Project Coordinator  
DOH Solid and Hazardous Waste Branch

Enclosures: Attachment 1- Navy letter to EPA Region 9 and DOH dated October 12, 2018  
Attachment 2- ~~Regulatory Agency letter to Navy dated XX 2018~~  
~~Conceptual Site Model Topics~~

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~~Attachment 3-Interim GFM~~  
~~Attachment 4-Interim Fate and Transport Analyses~~  
~~Attachment 5-Presentation Slideshow from August 2018~~

cc: Mr. Mark Manfredi, Navy (via email)  
Mr. Aaron Poentis, Navy (via email)  
Mr. Cory Waki, Navy (via email)

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